

ANIMAL DAMAGE CONTROL HANDBOOK

CHAPTER 20 - DAMAGE IDENTIFICATION

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CHAPTER 20 - DAMAGE IDENTIFICATION

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21 - INTRODUCTION. Correct identification of animal damage is necessary before sound prescriptions can be made for controlling damage. First, determine whether the damage is caused by insects, disease, weather, mammals, or birds. If the evidence indicates that an animal is causing the damage, the species must be determined.

Identification of animal damage often requires a thorough search for evidence. The feeding characteristics of some animals are so similar that it is almost impossible to make an identification without evidence such as droppings, hair, tracks, trails, or the presence of burrows in the area. For example, ants may girdle stems just above the root collar to nurture aphid colonies; grasshopper feeding on needles can be confused with bird clipping; birds perching on fast growing terminal leaders sometimes break them; and terminal shoots may be damaged by snow or ice. Such damage can be confused with mammal damage unless investigations are thorough. In some instances, it may be necessary to trap animals, build exclosures, or install cages to identify the damage-causing agent. Requisites for proper identification of animal damage include an inquisitive and open mind, a desire to do a thorough job, a knowledge of animals and their habits, and an ability to interpret field observations.

Training is necessary to ensure accurate identification of animal damage.

District Rangers with substantial reforestation programs are responsible for insuring that District reforestation personnel are trained in identifying animal damage to tree seedlings. This training should be coordinated by appropriate Silvicultural and Wildlife Staff in the Supervisor's Office.

22 - TYPES OF INJURY CAUSED BY WILDLIFE. A wide variety of damage by wildlife occurs on forests, rangelands, and associated areas. The most significant types of damage are grouped into three general categories according to the location where they occur.

Forests
Rangelands
Buildings and grounds

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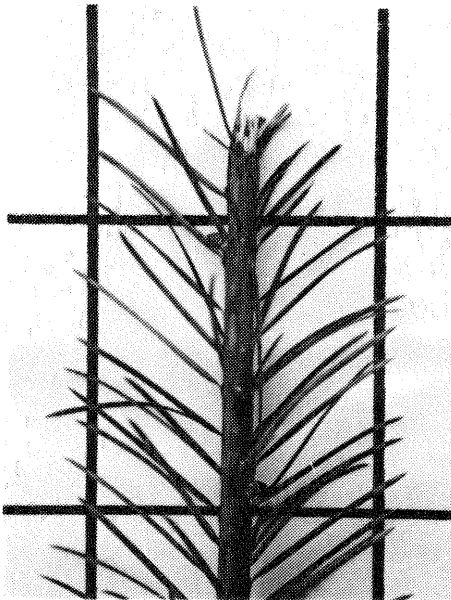
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22.1 - Damage to Trees. Animals damage trees in many ways ranging from clipping and browsing of foliage and leaders, to gnawing and girdling of stems and tree boles, to severe trampling injuries, to complete tree seedling removal. Keys have been developed to identify damage visually. A major problem, however, is the missing tree. Missing trees next to gopher activity can logically be attributed to gophers. However, when elk and deer pull trees they don't leave any evidence. Unless there are stake rows in the area, this type of damage is often completely missed by foresters.

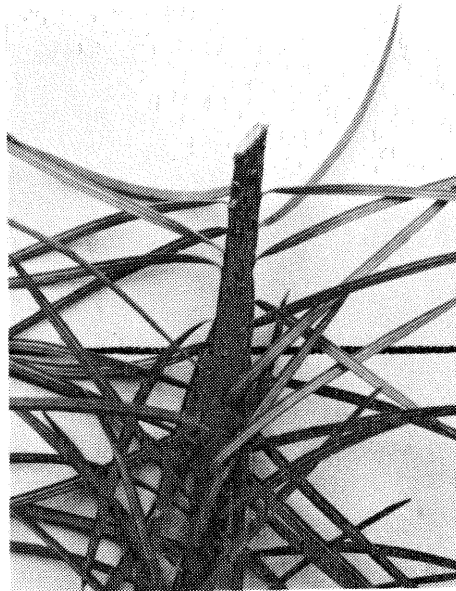
To identify damage to trees and shrubs, the characteristic differences between browsing and clipping need to be recognized.

1. **Browsing**, as defined in this Handbook, refers to the feeding habits of ungulates, including deer, elk, and livestock. Browsing on woody shoots during the dormant season leaves a ragged, splintered break (Figure 20.1), because these animals have no upper incisors.

2. **Clipping**, as defined in this Handbook, refers to the feeding habits of rodents and rabbits, which produce a smooth, oblique cut on woody shoots (Figure 20.1). These animals tilt their head to the side when using their chisel-like incisors to make an oblique cut.



Deer Browsed



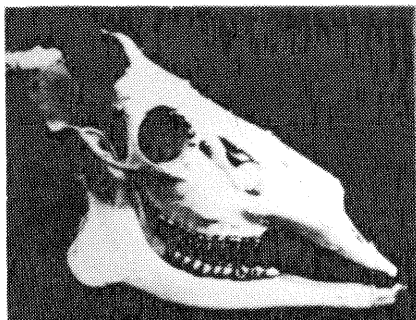
Rabbit Clipped

Figure 20.1. Comparison of twigs browsed by deer and clipped by rabbits.

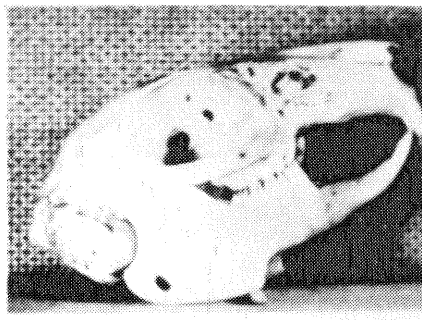
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A comparison of the skulls in Figure 20.2 shows a snowshoe hare with opposed incisors, which permits smooth clipping of stems. The white-tailed deer skull lacks upper incisors, which results in the ragged appearance of woody stems browsed by ungulates during the dormant season.



White-tailed Deer



Snowshoe Hare

Figure 20.2: Comparison of Skulls.

Figure 20.3: Comparative Width of Incisor Teeth of Some Common Gnawing Mammals ^{1/}

<u>Common Name</u>	<u>Average Width of Incisor in Inches</u>
Beaver	0.24
Mountain beaver	0.13
Porcupine	0.14
Black-tailed jack rabbit	0.10
Snowshoe hare	0.09
Cottontail rabbit, brush rabbit	0.09
Pocket gopher	0.06
Red squirrel	0.04
Dusky-footed woodrat	0.06
Meadow mouse	0.04
Red-backed vole	0.03
Deer mouse	0.02
Western gray squirrel	0.06

^{1/} Based on measurements of six or more adult specimens of each species from the Museum of Natural History at Oregon State University, Corvallis.

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22.11 - Key to Wildlife Injuries to Trees (Adapted from Wildlife Feeding Injuries on Conifers in the Pacific Northwest, by Lawrence, Kverno, and Hartwell, 1961.)

INJURIES TO SEEDLINGS AND SAPLINGS Key 1

INJURIES TO MATURE TREES Key 16

1. INJURIES TO SEEDLINGS AND SAPLINGS

Key

1a. ROOT CLIPPING 2

1b. STEM BARKING OR STEM BROKEN 3

1c. FOLIAGE CLIPPING AND BROWSING 10

2. Roots gnawed or clipped at root collar...injured seedling may be tipped over or partially pulled underground...

POCKET GOPHER see section 52.24

3. Barking on upper stem of saplings or large seedlings..... 4

3. Barking basal on saplings or seedlings..... 6

4. Bark abraded and shredded on upper stem; small lateral branches broken by antler polishing...

BIG GAME see section 51

4. Bark not abraded...lateral branches intact... bark stripped or gnawed from bole or upper branches 5

5. Barking by gnawing...primarily on pines...

PORCUPINE see section 52.29

5. Barking by means other than gnawing...bark stripped from terminal lateral shoots...branch tips browsed...

BIG GAME see section 51

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6. Bark stripped from base of saplings...vertical grooves present on exposed sapwood 7

6. Bark not stripped but gnawed from base of saplings or seedlings...lacks vertical grooves, but tooth marks on exposed sapwood many and prominent..... 8

6. Bark stripped or stem broken by trampling; no grooves or gnawing apparent...

BIG GAME..... see section 51

7. Strips of discarded bark at base of tree... vertical grooves on exposed sapwood...

BEAR..... see section 51.21

7. Strips of discarded bark absent...irregular vertical claw marks and scattered horizontal or diagonal tooth marks on exposed sapwood... numerous burrow entrances...

MOUNTAIN BEAVER..... see section 52.28

8. Individual tooth marks less than 1/16-inch (.16 cm) wide...gnawed surface of sapwood fuzzy and roughened...grassy areas with numerous surface runways...

MEADOW MOUSE..... see section 52.26a

8. Tooth marks distinct, 1/16-inch (.16 cm) wide or wider...surface of exposed sapwood not fuzzy..... 9

9. Tooth marks 1/16-inch (.16 cm) wide... sapwood deeply gnawed...above-ground damage visible immediately after snow melt...soil mounds, soil casts, and burrow openings...

POCKET GOPHER..... see section 52.24

9. Tooth marks 1/8-inch wide (.3 cm) or wider; sapwood deeply gnawed; 1/2- to 1-inch (1.2-2.5cm) oblong droppings and quills; pieces of outer bark around base of tree...

PORCUPINE..... see section 52.29

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10. Bud and needle clipping on terminal or lateral shoots...

BLUE GROUSE see section 53.1

10. No bud or needle clipping, but with cutting or browsing on terminal or lateral shoots..... 11

11. Clipping or cutting injuries..... 13

11. No clipping or cutting; browsing injuries only..... 12

12. Game trails, droppings and tracks on Douglas-fir and ponderosa pine regions...

BIG GAME..... see section 51

12. Browsing-like injury with bud or needle clipping...clustered droppings on stumps, logs and rocks...

BLUE GROUSE..... see section 53.1

13. Individual tooth marks distinct...
clipped stems usually larger than 1/4-inch
(.6 cm) diameter..... 14

13. Individual tooth marks indistinct...
clipped stems usually 1/4-inch (.6 cm) or less
in diameter...if of newly germinated seedlings,
field signs of rodents are needed to distinguish
from bird or insect injury..... 15

14. Dams, ponds, and lodges present...
cutting areas with distinct trails leading to
water...freshly peeled sticks; sign of active
beaver pond...wood chips present about stumps....

BEAVER..... see section 52.25

14. On larger seedlings, cutting of branches
beaver short stubs on main stem...piles of fresh
leafy cuttings at entrances of numerous burrows.

MOUNTAIN BEAVER..... see section 52.28

15a. Clipped stems and cotyledons of newly
germinated seedlings, in addition to seed
eating...

DEER MOUSE..... see section 52.26b

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15b. Clipped, newly germinated seedlings...
in ponderosa pine region and mixed conifer
region of southwestern Oregon and northern
California...numerous burrow openings are sign
of ground squirrels...

CHIPMUNK, GROUND SQUIRREL

.... see sections 52.21-52.22

15c. Barked stems of larger seedlings, also
clipped lateral and terminal shoots of small
seedlings...surface runways in grassy areas...

MEADOW MOUSE..... see section 52.26a

15d. Numerous burrow entrances, about 6
inches (15-cm) in diameter, in area...limited
to Douglas-fir region...

MOUNTAIN BEAVER..... see section 52.28

15e. Characteristic, flattened ovoid
droppings...may inhabit burrows of the mountain
beaver

SNOWSHOE HARE AND BRUSH RABBIT

... see section 52.3

15f. Clipped small ponderosa pine seedlings...

PORCUPINE..... see section 52.29

16. INJURIES TO MATURE TREES

16a. TREE CUTTING..... 17

16b. BOLE BARKING..... 18

16c. BRANCH AND TWIG CUTTING..... 24

17. Conical top to stumps, with prominent tooth marks...

BEAVER..... see section 52.25

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18. Basal injuries.....	19
18. Crown injuries.....	21
19. Long, prominent vertical grooves on exposed sapwood...large strips of discarded bark at base of tree...	
BEAR.....	see section 51.21
19. Vertical grooves and strips of discarded bark lacing...horizontal or diagonal toothmarks.....	20
20a. Gnawing sign with distinct horizontal or diagonal tooth marks, 1/8-inch...primarily Douglas-fir in Cascades...	
PORCUPINE.....	see section 52.29
20b. Gnawing sign with indistinct horizontal or diagonal tooth marks 1/16 to 1/8 inch (1.6-3.2 mm)... occasional vertical claw marks where bark has been stripped from bole...numerous burrow entrances in area... coastal Douglas-fir region...	
MOUNTAIN BEAVER.....	see section 52.28
20c. Gnawing sign with tooth marks 1/16-inch wide (1.6 mm)...Barking occurs in irregular patterns on lower 7 feet (2.1 m) of tree predominately lodgepole pine...	
POCKET GOPHER.....	see section 52.24
21. Long, prominent vertical grooves on exposed sapwood of upper bole...large strips of discarded bark at base of tree...Douglas-fir region...	
BEAR.....	see section 51.21
21. Vertical grooves and strips of discarded bark lacking...prominent horizontal or diagonal tooth marks or gnawing sign on sapwood indistinct.....	22
22. Prominent horizontal or diagonal tooth marks on exposed sapwood of upper bole and major branches...oblong droppings up to 1-inch (2.5cm) long under tree...	
PORCUPINE.....	see section 52.29

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22. Prominent tooth marks lacking..... 23

23. Short strips of discarded bark (1/2-inch (1.3 cm) wide by 2 to 3 inches (5.1 - 7.6 cm) long) under injured tree...sign of fine gnawing visible on exposed sapwood...

TREE SQUIRREL..... see section 52.23

23. Short strips of bark absent...large, bulky stick nests either in crowns of trees or on ground in vicinity of injured trees...barking occurs in dense stands of young-growth

DUSKY-FOOTED WOOD RAT
..... see section 52.27

24. Cutting confined to branch tips and twigs...peeled or debudded shoots litter ground

TREE SQUIRREL..... see section 52.23

24. Cutting of moderate-sized branches...no peeled twigs...

PORCUPINE..... see section 52.29

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22.2 - Rangeland Damage. Grasslands and meadows are subject to three general types of animal damage: plant destruction, soil compaction, and erosion.

22.21 - Plant Damage. Plant damage occurs in two ways and is caused by both domestic and wild animals. The first consists of a gradual reduction in plant density and vigor over many years. Domestic stock, deer, and elk are destructive when the numbers of animals or intensity of use is permitted to increase beyond the carrying capacity of the range. This type of damage is often difficult to recognize because it develops slowly. Changes in range condition can be detected by establishing Parker three-step range transects and by making regular utilization checks for several years (FSM 2210, FSH 2209.21 R6). Identification of the type of animal causing damage can be made by direct observation of animals and by animal signs in the area.

The second type of plant damage is the removal or covering of vegetation that results from feeding and burrow-building activities of certain small mammals. This type of damage may take place over a much shorter period. Animals primarily responsible include pocket gophers, moles, meadow mice, and ground squirrels. These animals all have small home ranges, and can be identified as to group by their burrow-building and food-gathering activities.

1. **Mound Building (Gophers and Moles).** Signs of gopher and mole activity are sometimes confused because both are burrowing animals and spend most of their time underground. Above ground signs of these animals are distinguished by the following characteristics:

(Continued on next printed page)

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Gophers (see 52.24)

Burrows seldom form a visible ridge on the ground surface.

Material excavated from burrows is formed into fan-shaped mounds or, when under snow, deposited in long tubular cylinders (snow casts).

Mounds consist of finely divided soil particles.

The burrow entrance is usually near the edge of the mound and is closed by a distinct earthen "plug" that often leaves a visible depression.

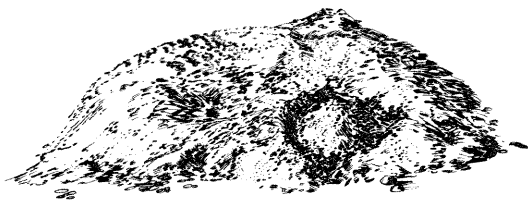


Figure 20.4. Pocket gopher mound, showing typical fan-shaped appearance, and earthen "plug" in lower-right center.



Figure 20.6 Pocket gopher snow casts showing typical tubular cylinders and occasional overlaying of casts.

Moles (see 52.12)

Much of their burrowing is close to the surface and often raises a visible ridge.

Excavated material is usually piled in roughly circular mounds, and rarely in casts.

Mounds often have a lumpy appearance.

Soil from burrows is pushed upwards, the opening to the burrow is usually located near the center of the mound, and lacks soil plugs



Figure 20.5. Mole mound, showing lumpy volcano-like appearance.



Figure 20.7. Mole tunnel showing typical shallow ridge formed when feeding near the surface.

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2. **Meadow Mice** (see 52.26a). Signs of meadow mouse activity in grasslands and meadows are distinguished as follows:

Meadow mouse runway systems form an intricate network through dense vegetation. When populations are high, these runway complexes are often only inches apart and frequently intersect. Runways can be found by separating matted vegetation or lifting surface litter.

Meadow mice require dense cover and seldom will be found in sparse cover or openings.

Areas where mice have destroyed perennial vegetation often are invaded by annuals such as cheatgrass and tarweed. Mouse depredations frequently can be recognized at a distance by the color patterns of invading or clipped vegetation, which gives the landscape a mottled appearance.

Shrubs or tree seedlings growing in areas with high mouse populations often are girdled below the root collar and killed. This damage is easily detected by scraping away the loose duff and soil at the ground line. Girdling also may be found on stems and on branches. Identification of mice to species may require capturing them with snap or live traps (see 32).

3. **Ground Squirrels** (see 52.21). The Columbian and Belding ground squirrels commonly damage grass or meadow areas.

Identification of ground squirrels is simple during spring and early summer when they are actively feeding. Specimens can be collected for positive identification by shooting or trapping.

The presence of open burrows, with little vegetation growing near the entrances, is a good indicator of active dens.

4. **Rabbits and Hares** (see 52.3). Jack rabbits are seldom abundant on National Forests in Region 6. Signs of rabbit feeding on grasses or forbs are difficult to distinguish from that of rodents, but fecal droppings are distinctive. As with rodents, identification of rabbit damage must rely on indirect signs which indicate the presence and the abundance of animals in an area. Mark-recapture trapping and pellet group counts are the most reliable means of determining presence and abundance of rabbits.

22.22 - Soil Compaction. Soil compaction can occur when excessive numbers of big game or domestic livestock use areas of heavy, clay soils saturated with moisture.

Areas damaged by compaction have a dimpled appearance, and animal hoof prints are discernible if the trampling is recent.

When compaction is severe and prolonged, plant density is reduced, perennial plants are replaced by annuals, water infiltration is inhibited, and overland water flow is increased. Thus, the area is subject to greater wind and water erosion. Areas along waterways and around meadows are particularly susceptible to compaction damage. Sites with shallow soils or poor drainage that are used in the early spring also may receive heavy damage.

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22.23 - Erosion. Erosion may be initiated by burrowing animals, including gophers, moles, ground squirrels, badgers, and meadow mice. In some instances, burrows are oriented down slope and serve as small conduits for water from melting snow or heavy rains. This type of damage is observed in the spring when snow is melting. Later in the summer, drying, settling, wind action, and animal use obliterates much of the evidence related to the initial cause of the damage. (Field sign of mice, ground squirrels, gophers, and moles are described in section 22.1.)

22.3 - Damage to Building and Grounds. Various kinds of birds and mammals may occupy buildings, adjacent grounds, campgrounds, and other areas of human activity where they constitute a nuisance, or hazard to human health. Frequently little actual damage is done, but the nuisance problems may warrant removing or discouraging these animals.

22.31 - Buildings.

1. **Birds.** Cavity nesters (see 53.2), such as sparrows, starlings, and swallows, often utilize open airvents, spaces around utility lead-ins, and other openings for nest-construction sites.

2. **Rodents.** Gnawing typically occurs wherever rodents are present.

a. **Porcupines** (52.29). Porcupines are the largest gnawing animals found around buildings. They have a definite liking for glue in plywood. Items such as work gloves, leather goods, and tool handles are especially attractive. Large droppings, 1-inch (2.5-cm) long, are characteristic of porcupines.

b. **Wood Rats** (52.27). Sometimes referred to as pack rats, this native forest rat with a large bushy tail may cause problems in buildings by fouling stored materials and food supplies. A large, bulky nest and droppings about one-third inch (0.8-cm) long are characteristic of wood rat presence.

c. **Mice** (52.26). Deer mice which are abundant on forest lands frequently move into buildings. Small holes, 1/2-inch (1.2-cm) or less in diameter, allow mice to enter. Droppings about 1/8-inch (0.3-cm) long, chewed-up paper, and seed hulls are signs of mouse activity.

d. **Tree Squirrels** (52.23). Tree squirrels such as the red squirrels occasionally move into buildings or cone-storage facilities. Their presence can be determined by their daytime activity, food-storage habits, and hidden piles of pine and fir cone parts that have been discarded as the squirrel removes the seeds from the cones during feeding.

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22.32 - Grounds. Animal use of grounds around Forest Service buildings often leads to excessive maintenance costs, may interfere with human activity, or constitute a threat to human health.

1. Use of Ornamentals, or Other Lawn or Garden Plants. For identification of animals using shrubs or trees, see key to conifer use (see 22.11).

2. Digging and Burrowing Mammals. Ground squirrels, pocket gophers, and moles may cause damage or constitute a nuisance, and occasionally may require control. For identification of animals utilizing livestock-holding areas, grounds around buildings, campgrounds and other areas of human activity, see 22.21.

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